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High-speed fluoroscopy: A novel method for dynamic imaging of the equine foot

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Aims: This study describes the distal limb kinematics including intra-horse and inter-horse variability, and variability between gaits in sound horses using high-speed fluoroscopy which allows cineradiographic examination at speed. **Methods:** Distal limb kinematics were collected at walk and trot from 6 sound horses using a high-speed fluoroscopy system set over a force plate. The dorsal proximal interphalangeal joint (PIPJ) angle and the dorsal distal interphalangeal joint (DIPJ) angle were repeatedly measured at toe-on, 25, 50 and 75% stance. **Results:** The PIPJ and DIPJ showed overall extension through stance. The mean (± s.d.) range of motion (ROM) during stance of the PIPJ was 10 ± 3° (walk) and 9 ± 3° (trot) and for the DIPJ was 29 ± 5° (walk) and 27 ± 6° (trot) showing significant differences between strides, gaits and horses ($P<0.001$). **Conclusions:** High-speed fluoroscopy allows for kinematic assessment of the distal limb. The ROM of the PIPJ observed was similar to the literature whilst the ROM for DIPJ was less than previously reported. **Practical significance:** Kinematic analysis allows investigation of forces acting on bones, joints, ligaments and tendons. This is of special interest in the foot as the most common site of forelimb lameness in the horse; however, kinematic analysis of the foot has to date been a challenge due to the presence of the hoof capsule. The described method allows reliable assessment of foot kinematics at different gaits and speeds, which can be used for future studies to assess the effectiveness of treatment and monitor disease progression. **Ethical animal research:** Ethical approval was granted by the Royal Veterinary College Ethics Committee. **Sources of funding:** The Royal Veterinary College. **Competing interests:** None.

16.30–16.45

Use of transoesophageal ultrasound to visualise the aortopulmonary region in two normal Friesian horses and three Friesians with aortic rupture or aortopulmonary fistulation

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Aims: Aortic rupture and aortopulmonary fistulation are reported with increased incidence in the Friesian breed. In contrast to Warmblood horses, the aorta in Friesian horses typically ruptures at the level of the ligamentum arteriosum (Ploeg *et al.* 2013). This remote location often creates difficulties in identifying the rupture with transthoracic ultrasound. The aim of this study was to evaluate the usefulness of transoesophageal visualisation of the aortopulmonary region with a linear probe in both standing unsedated horses and horses suffering from aortic rupture. **Methods:** Five Friesian horses, 2 healthy and 3 affected, were subjected to transthoracic ultrasound (2.5 MHz sectorial probe GE) followed by transoesophageal ultrasound (7.5 or 10 MHz linear probe). Correct oesophageal introduction of the probe was guided by means of endoscopy. After visualisation of the aortopulmonary region, horses were anaesthetised, and the transoesophageal ultrasound was repeated. In 4 horses, simultaneous carotid artery catheterisation was performed, to visualise the catheter at the zone of interest. After obtaining a diagnosis, all affected horses were subjected to euthanasia and autopsies were performed. **Results:** The aortopulmonary region could be visualised in all horses. In the affected horses presence or absence of a periaortic blood cuff, aortic rupture and or aortopulmonary fistulation could be clearly identified. In one horse during carotid catheterisation, the catheter could be guided into the fistulation site, which was clearly visualised by means of transoesophageal ultrasound. **Conclusions and practical significance:** Transoesophageal ultrasound by means of a 7.5 or 10 MHz linear probe allows for good visualisation of the aortopulmonary region and for diagnosing aortic rupture in Friesian horses. The technique will be further developed as an elegant noninvasive way to screen Friesian horses for this pathology, even in the standing nonsedated horse. **Ethical animal research:** Owner informed consent was obtained for all horses. **Sources of funding:** This study was funded by the Dutch Royal Friesian Studbook and Scil Animal Care. **Competing interests:** None.

Reference

Ploeg, M., Saey, V., de Bruijn, C.M., Gröne, A., Chiers, K., van Loon, G., Ducatelle, R., van Weeren, P.R., Back, W. and Delesalle, C. (2013) Aortic rupture and aorto-pulmonary fistulation in the Friesian horse: Characterisation of the clinical and gross *post mortem* findings in 24 cases. *Equine Vet. J.* **45**, 101-106.

16.45–17.00

Changes in intestinal mucosal microvascular perfusion assessed using orthogonal polarisation spectral imaging in the horse

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Aims: Although several markers for measuring global tissue perfusion are available, there are currently no practical measurements of capillary microvascular perfusion in horses with hypovolaemia. Orthogonal polarisation spectral (OPS) imaging allows assessment of capillary microvascular perfusion by visualisation of mucosal blood flow. This study aims to demonstrate that administration of the α_2 adrenoreceptor agonist detomidine, results in measurable changes in mucosal blood flow that can be determined using OPS. We hypothesise that these changes will mirror known aberrations in total peripheral resistance and cardiac output. **Methods:** Microvascular blood flow was recorded using OPS placed manually, *per rectum* in 6 normal horses (weighing 603 ± 134 kg) undergoing sedation for a range of clinical procedures. The OPS recordings were made prior to and following sedation (5, 10, 20 min) with detomidine (10 ug/kg bwt) and butorphanol (10 ug/kg bwt) administered by i.v. injection. Microvascular perfusion was determined using standardised methods from OPS recordings including proportion of perfused vessels (PPV),